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ABSTRACT

This study examined the extent to which computer training has affected Meadowbrook Elementary School, a suburban elementary school on Long Island, New York. The investigation began with a focus group comprised of staff members. Five teachers were chosen and given a series of eight questions that addressed the parameters of computer training in the school. A survey was then administered; 45 of 70 professional staff returned the surveys. Responses were categorized as classroom teachers, special area teachers, and support staff. Information was gathered related to proficiencies and competencies, software applications, observed results of student computer usage, overall benefits for students, and staff development preferences. The following three issues were identified for further analysis: (1) there is little or no difference in findings among the categories of instructional staff, although there were significant differences within job categories; (2) most respondents in all categories believe that intensive training sessions are the key to further integrating the user of computer technology in the instructional setting; and (3) approximately half the staff possesses advanced computer skills regardless of job category. Focus group questions and results are appended. (AEF)

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TEACHER COMPETENCIES AND TECHNOLOGY INTEGRATION

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TEACHER COMPETENCIES AND TECHNOLOGY INTEGRATION

Does the emperor wear new clothes? Critics of technology in schools are beginning to question the value of that technology. Do public schools truly " wear " their use of educational technology properly, or is it so much window dressing? To what extent has computer training impacted elementary school instruction? Do schools efficiently couple the expenditure of millions of dollars in upgrading technology, with appropriate teacher training? What kind of computer training is most necessary and successful in bringing about change? What is happening in the classroom as a result of that training? Is technology's potential truly realized?

Background

A need for meaningful technology standards for educators and students exists (Peck 1998). Taken together with the movement to increase and raise standards in all areas of student achievement including computer technology, it behooves educators to assess the state of teacher standards and competencies in both computer competence and use.

The International Society for Technology in Education (ISTE), for example, provides the National Council for Accreditation (NCATE) with guidelines for assessing both the educational computing – related curriculum, and the computing infrastructure presently in teacher preparation institutions. The Curriculum Guidelines that ISTE offers, encompasses five sets of standards:

1. recommended foundations in technology for all teachers,
2. an educational computing and technology literacy endorsement,

3.a secondary computer science education endorsement,

4.a secondary computer science education bachelor's degree program, and

5.an advanced program in educational computing and technology leadership.

Peck (1988) notes that "...the ISTE Foundation Standards reflect professional studies in education that provide fundamental concepts and skills for applying information technology in educational settings. All candidates (teachers) seeking initial certification or endorsements in teacher preparation programs should have opportunities to meet the educational technology foundations standards" (Peck, 1998). Similarly, some states have established technology competencies for teachers. Technology Competencies for Connecticut Educators (1998) and North Carolina Technology Competencies for Educators (1998) are two examples.

The Connecticut competencies addressed questions such as "How do I use technology to enhance my professional and personal productivity", "How do I integrate technology into the teaching/learning process?" And, "How do I use technology to encourage student inquiry and higher level thinking and processing skills? Competencies like these provided useful guidelines and components for assessing teacher technology competencies or the extent to which technology has been integrated into a curriculum.

Purpose

We centered on four factors in order to determine the staff's present status in their computer training and instructional use:

1) *Future in-servicing directions* – to determine the present competencies our teachers have documented, in order to chart new in-servicing needs.

2) *Future teaching methods* – to determine which computer applications have been most successfully integrated with classroom instruction.

3) *Training connection* – to determine whether teacher competencies translate into actual classroom practice.

Procedures

Four researchers from the Department of Educational Leadership and Technology, School of Education, Dowling College, were thusly armed to examine the extent to which computer training had impacted suburban elementary school on Long Island, New York.

The investigators began by interviewing a focus group comprised of staff members from the Meadowbrook Elementary School. The focus group interviews enabled the investigators to gather data for construction of a needs assessment survey. The investigators also chose this interactive group process technique in order to use the focus group's input to provide direction for more in depth analysis of the entire staff at Meadowbrook Elementary School.

The investigators chose five teachers for this group. Criteria for selection included, experience with computer use in the school, interest in staff development, ability to articulate concerns and issues relevant to computer instruction, and representation of the school professional staff. One teacher is the school computer teacher, another is the music teacher who participated in a grant for the use of electronic keyboards in the classroom. These two special subject teachers see all children K-5 in both regular education classroom and special education mainstreamed settings. The remaining three teachers teach 2nd, 3rd and 4th grade classes.

The focus group members were given a series of eight questions that addressed the parameters of computer training in the Meadowbrook School. The focus group questions and their responses to the question are presented in Appendix A.

The investigators incorporated the group's responses into a summary sheet, which they later reviewed with the focus group participants. This debriefing enabled the investigators to solidify the group's views about inservice training and its impact on future teacher methods.

The investigators' next step was to develop and administer a survey instrument to the entire school. Forty five of seventy professional staff returned the surveys. The responses were categorized as classroom teachers, special area teachers and others, e.g. teacher assistants and permanent substitutes. A frequency distribution of the responses was

tabulated for each of the job categories in order to determine any differences among the groups.

Participants

The survey participants were teachers and related teaching staff of the Meadowbrook Elementary School. The Meadowbrook school is one of five elementary schools in a middle class suburban community approximately twenty five miles from New York City. Seventy eight teaching, non- teaching, and administrative staff members received the survey. Those teachers who received the survey ranged in experience from beginning teachers to those with more than twenty years experience. All classroom and special area teachers have permanent certification and work with children in grade levels Kindergarten through grade five, 12% of whom are classified as being special educational needs and 6% of whom are receiving ESL (English as a Second Language) services.

Forty five participants responded to the survey. Twenty six are classroom teachers, eleven are special area teachers, eight are other professionals who participated, including the nurse and teacher's assistants. Special subject teachers represent the areas of art, music, physical education, computer, library media, specialized reading lab teachers, and math lab teachers. Two of the returned surveys were not included in the tabulation because six of the fourteen questions were not answered.

Materials

The materials used include a Needs Assessment Proposal, Focus group Questions, Summary of Focus Group Responses and Technology Survey (See Appendix).

Findings

This section contains sections describing proficiencies and competencies, software applications, observed results, and staff development preferences.

Proficiencies / Competencies

Nearly twice as many classroom teachers indicate a proficiency in the use of the mouse and word processing compared to their use of the internet and of e-mail. A similar pattern was also seen in the special subject area teachers and of other instructional staff.

Proficiencies of All Groups Surveyed - 43 Total

Mouse	**42**
Word Processing	**38**
Internet	**24**

The staff evidenced mastery of the most basic competencies across all job categories. For example, forty two of the forty three respondents indicated a proficiency in the use of the mouse and thirty eight of the forty three respondents indicated similar proficiency in

word processing. A smaller but impressive number, twenty four of the forty three, indicated experience in use of the internet.

Software Applications

There were differences in the types of software used among the job categories for classroom teachers. Drill and practice software was the most common (twelve of twenty four). Content software (eleven of twenty four) closely followed. Productivity software (seven of twenty four) was next for classroom teachers.

Types of Software Used	
Teachers (n=24)	
Drill and Practice	**12**
Content Software	**11**
Productivity Software	**7**
Special Teachers (n=11)	
Content Software	**5**
Drill and Practice	**3**
Productivity	**3**
Instructional Support Staff (n=8)	
Drill and Practice	**2**
Content	**1**
Productivity	**1**

In contrast, a large proportion of special teachers favored content software (five of eleven), followed by drill and practice (three of eleven). An identical pattern was seen in the responses from " other "instructional support staff: one out of eight preferred content , two out of eight, preferred drill and practice and one out of eight preferred productivity.

Observed Results

Teachers noted a variety of results that students derived from computer usage. Of the twenty-four classroom teachers surveyed, thirteen indicated that students could process information and concepts as a result of the use of computer. Eleven classroom teachers indicate that students are able to express themselves in writing. Nine classroom teachers indicate that they utilize programs that provide direction and feedback to students in order to develop particular skills or talents. Finally, five teachers indicate that they use computers to illustrate important events or concepts.

Uses of Computers with Students

	Teachers (n=24)	Special Teacher (n=12)	Instructional Support Staff (n=8)
Process Information	13	3	2
Expression/Writing	11	2	3
Direction/Feedback	9	2	2
Illustrate Events/Concepts	5	2	1

Special subject teachers indicated that the computers are used in several ways for their students. Two of eleven teachers saw value in the computers in the areas of illustrating important events, providing students with an opportunity to express themselves in writing, and utilizing programs that present students with direction and feedback. Using programs to allow students to process information was the most common response in this category (three of twelve).

The remaining instructional staff indicated that the computer is used most commonly as a means of providing students with an opportunity to express themselves in writing (three of eight). The areas of processing information and providing direction and feedback closely followed student expression with a response of two of eight surveyed. The least common use of the computer by the other instructional staff was for the illustration of important events and concepts (one of eight)

Overall benefits for students

The most common benefit reported by classroom teachers in the use of computer technology was in the category of providing immediate feedback to students (eleven of twenty four). The next most frequently observed benefit was in engaging in the writing process (nine of twenty four). The next most common benefit that teachers observed was in promoting the critical thinking process. The least common benefit observed by teachers as a result of the use of computer technology, was in the improvement of the quality of student work (five of twenty four). An equal number of special subject teachers

indicated benefits in the areas of quality of student work and engaging the critical thinking process (five of eleven).

Benefits to Students

	Teacher	Special Teacher	Instructional Support Staff
Immediate Feedback	11	4	3
Engagement in Writing Process	9	3	3
Critical Thinking	7	5	3
Quality of Student Work	5	5	1

A small number of special area teachers observed the benefit of providing immediate feedback to students (four of eleven). Fewer still responded that the computer offered the benefit of allowing students to easily engage in the writing process (three of eleven).

Equal numbers of other staff saw benefits in providing immediate feedback, student engagement in writing and engage in the critical thinking process (three of eight). Only

one "other" staff member indicated an improvement in the quality of student work as a benefit.

Staff Development Preferences

Eighteen of twenty-four classroom teachers indicated that the future design of a computer training program should include intensive training sessions. Demonstration lessons were also preferred by fourteen of twenty four teachers as an element for inclusion in a computer training program. Thirdly, providing teachers with lesson plans and follow up visits by staff developers to the teachers' classrooms were seen as valuable additions to a computer training program (eleven of twenty four classroom teachers).

Future Training Programs

	Teacher	Special Teacher	Instructional Support Staff
Intensive Training Sessions	18	9	4
Demonstration Lessons	14	6	4
Lesson Plans	11	5	4
Follow-Up Visits	11	6	5

Similarly, nine of eleven special subject teachers indicated a preference for intensive training sessions. Six of eleven special subject teachers preferred follow-up visits and demonstration lessons. Five of eleven of these same teachers preferred prepared lesson plans. Other instructional staff (four of eight) preferred intensive training, provision of lesson plans, and more demonstration lessons. Five of the eight " other " requested follow-up visits by staff developers.

Conclusions

The data lead the researchers to three issues for further analysis:

1. There is no little or no difference among the categories of instructional staff with respect to their reported computer competencies, use of applications, demonstrated student skills, benefits to students, or in the development of computer training programs. However, there were significant differences within job categories.

Inasmuch as there is no difference between each teaching category, the researchers conclude that the present status of computer instruction at the Meadowbrook School has been evenly distributed among the staff.

2. Thirty one of thirty three respondents in all categories believe, that intensive training sessions are the key to further integrating the use of computer technology in the instructional setting.

This fact raises more questions than it answers and suggests a need for further study. It is not clear from the responses just what intensive means. We assume it means one-day, but it is not clear that the respondents had the same meaning.

Marcinkiewicz (1992) cites evidence that teachers need to feel " perceived relevance," and "self–competence", in order for computer usage to be effective. His study suggests that an administrator should honor a staff's preferences in their choice of staff development for computer training, and that the faculty's wishes deserve both validation and integration into the overall staff development plan. However, given the premise that the definition of intensive training is vague, it is important to clarify what the staff defines as intensive training.

3. Approximately half of the staff possesses advanced computer skills regardless of job category. This suggests that there should be a two-tiered training system that would account for the varying levels of competency or that skilled people might be paired with unskilled people in a training program. Intensive training should be defined as; demonstrations /applications with follow-up visits incorporated into the training process. This is a case when one size does not fit all.

All too often, administrators tend to formulate staff development programs that presume that all teachers are at the same level. Inasmuch as the data from this study clearly indicate skills differences, the Meadowbrook administrator is well advised to craft a staff development plan that recognizes and accommodates the differences.

Does the Emperor wear new clothes?

The little boy who had the temerity to state that which his elders were not willing to state, that the emperor wore no clothes, may well have forced the whole kingdom to consider their emperor in a more accurate light. In like manner, surveys and needs assessments of educators, about the status of technology in schools, followed by hard analysis, will ultimately be the only ways by which we can gauge the success or continued needs of a school in the face of accelerating changes in educational technology. Similarly, those who accurately point out successes, failures, and needs, do students and taxpayers immeasurable service.

Appendix

FOCUS GROUP QUESTIONS

1. **Describe the training you have had to date in use of the computer?**
2. **What experience other than formal training have you had in computers?**
3. **What skills do you posses that enable you to effectively use computers?**
4. **What types of applications are you presently using? e.g. Productivity (data base, spread sheet, word processing); Content, e.g. EduQuest, Compton, Grolier, Encarta, PC USA, Drill and Practice, Simulation, e.g. Decisions, Decisions, Oregon Trail, Ocean Quest.**
5. **How have you integrated the computer into your classroom?**
6. **How has the application of technology allowed you to teach things now that you were not able to teach before?**
7. **If you could design a computer training program what elements would you include?**
8. **Where do you think that technology is taking the future of education?**

- FOCUS GROUP RESULTS
  - Describe the training you have had to date in use of the computer?
  - Private lesson 2 hours, in school 1/2 day training
  - Apple/Windows/IBM
  - Music in Education curriculum by Yamaha-Macintosh
  - Masters level courses in general technology, multi-media, and Internet
  - Windows, Inspiration software, Internet(websites), E-Mail
  - What experience other than formal training have you had in computers?
  - Use personal computer for information gathering
  - Personal use, E-mail, Internet, word processing - used to put reunion together
  - Use a personal computer at home
  - Most of my experience has been self-trained. I have reached a level which enables me to educate others in this field.
  - Informal training - receiving help from friends who are knowledgable with computers. Spending time on the computer to explore different areas of technology: word processing, E-Mail, Internet
  - What skills do you posses that enable you to effectively use computers?
  - Just beginning
  - Typing
  - Use it every day in the classroom; but I certainly feel I need more training and experience.
  - My interest in computers and understanding of curriculum is what allows me to effectively use computers.
  - What types of applications are you presently using? e.g. Productivity (data base, spread sheet, word processing); Content, e.g. EduQuest, Compton, Grolier, Encarta, PC USA, Drill and Practice, Simulations, e.g. Decisions, Decisions, Oregon Trail, Ocean Quest.
  - Just beginning
  - Productivity, word processing, Content, Grolier, Encarta
  - I only use the Music in Education curriculum
  - Productivity: word processing, research and simulation
  - Productivity: word processing, Content - Encarta, Inspiration, Drill and Practice
  - How have you integrated the computer into your classroom?
  - With Social Studies and Language Arts with new materials and programs
  - Used videos, resources(Encarta) games for review of information-writing skills
  - Use the computer in conjunction with keyboards to teach general music. It is a hands-on approach with every student using a keyboard that is connected to one computer. The application used contains lesson plans, songs, and listening selections. I also give quizzes in which students answer and receive immediate feedback using their keyboards. Record keeping is also built into the application. By using the ME I am able to teach thirty children not only to play music, but to understand and appreciate it much more. I cannot imagine teaching general music the way I did before I used technology.
  - I have a computer lab and use computers daily to integrate with school curriculum.
  - I use the computer to reteach concepts taught in class. It is also great for enrichment work. The computer programs have many different levels to meet all children's needs. I also do a culminating activity on the computer after the study of a unit. Example: Fable Unit - Inspiration Literature Web
  - How has the application of technology allowed you to teach things now that you were not able to teach before?
  - I see a clear path now using computer for final products.
  - Instant videos, speeds up processing (e.g. butterfly emerging, phases of moon), student writing, teacher use.
  - Technology is a natural motivator for students. They will do complex academic work in order to reach a goal in the application. Without technology, students' interest level is decreased and the desire to do more difficult work is not there.
  - If you could design a computer training program what elements would you include?
  - Word processing, resources, graphics - examples of lessons provided for adaptation
  - I would give the classroom teacher a day of intensive training use a given application. I would then bring the class into the lab with the teacher and computer trainer for at least two half-day sessions using that application.
  - Time, time, and time for teachers to participate and practice skills.
  - Computer training - word processing, graphics, lesson plans, Internet use, lots of time.
  - Where do you think that technology is taking the future of education?
  - Use to implement information gathering, keeping records, keep children's work
  - Speed up process of learning
  - Technology has made information immediately accessible. The same problem exists, however, in that students must know how to access this information. In my program, students frequently have a problem on a quiz in that they do not send their answer to the computer correctly. The computer will say, "Try again." They think they have the wrong answer, and I have to remind them that the computer cannot read their mind. They have to use it correctly in order to get the right answer. It's the same for educators; we have to be able to use technology to affect the future of education.
  - Technology's impact on the future of education will be to allow students to explore any interest. The role of teachers will be to guide students as they explore the world around them, and to use the medium of technology in order to further students education.

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